

Bit Maker

All may be familiar with the palindrome,ie, a number whose reverse is the same as that of the original number. For example 5115 is a palindrome since its reverse is 5115. So now your task is to find minimum possible number whose binary equivalent is a palindrome.

For Example : if input is 4 (with binary equivalent 100) then the output is 5 (with binary equivalent 101)

Input

Input starts with 't' the number of test cases , $1 \leq t \leq 1000$

then followed by t lines with numbers N , $1 \leq N \leq 10^{18}$

Output

Display min possible number greater than N whose binary equivalent number is a palindrome.

Example

Input:

3

4

8

12

Output:

5

9

15